~~responsibility to reach out and embrace the general membership to share in the refinement of goals and professional initiatives.~~

~~Petronius Arbiter said, "… reorganizing … could produce confusion, indifference, and demoralization." Clearly, these factors have been apparent, not only in technology education but in numbers of other disciplines. Let's not visit them as negative consequences, but as incentives and motivators to grow and prosper as Warner envisioned the field.~~

~~Finally, my expectation is that William E. Warner's final admonition would be a reminder that this has been and continues to be a *wonderful* profession! And, its future is in your hands, so go forth and be the best you can!~~

~~*Dr. James J. Buffer, Jr. is Horace G. Fralin Professor and Dean Emeritus, College of Education, Virginia Tech; Associate Dean of Research and Professor of Education Emeritus, Ohio State University. He is a member of Alpha Chapter and received his Distinguished Service Citation in 1987.*~~

Ethics for Industrial Technology

Kurt A. Rosentrater and Radha Balamuralikrishna

Abstract

This paper takes aim at one specific, as well as basic, need in teamwork and interdisciplinary projects – ethics and its implications for professional practice. A preliminary study suggests that students majoring in industrial technology degree programs may not have adequate opportunity to formally study and engage in ethical aspects of technology vis-à-vis the practices of the profession. It is reasonable to assume that the ethical dilemmas faced by an industrial technologist would parallel those of engineers and managers. To address this issue, this paper identifies a domain of knowledge that would constitute a necessary background in ethics for industrial technologists, examines various resources for teaching, and makes recommendations from a pedagogical point of view.

Keywords
Curriculum Development, Ethics, Industrial Technology, Professionalism, Societal Obligations

Introduction

The college education of engineers and technologists in the United States in key areas such as construction, manufacturing, communications, and transportation manifests itself in the form of three broad degree programs that can be identified as engineering, engineering technology, and industrial technology. Engineering degree programs have a long history in the U.S., and even though certain misconceptions regarding the profession of the engineer may still exist among the general public, it is fair to state that the profession is relatively well understood among high school students and the public at large.

All fifty states work with the NCEES (National Council of Examiners for Engineers and Surveying) in licensing and maintaining the professional competence of engineers (http://www.ncees.org). Engineering technology and industrial technology, however, belong to a newer class of degree programs that have

generally eluded public knowledge (Minty, 2003). The four-year "technology" degree programs have been in popular existence for only the past 30 to 40 years, and currently the professions of "engineering technologist" and "industrial technologist" are not regulated by statutory agencies. Certain states do allow graduates holding engineering technology degrees to qualify for the title of "professional engineer" by examination. To date, however, a degree in industrial technology does not meet the educational requirements to seek licensure in engineering in any of the fifty states. It is also fair to state that the profession of "engineer" is universally understood; however, the terms "engineering technologist" and "industrial technologist" pose significant confusion for many, especially among educators based outside the United States. The fact remains that we have a large community of engineering and industrial technologists in American industry today, and that pool continues to expand on a yearly basis (www.nait.org).

Although much has been said regarding the distinctive competency of industrial technology (www.nait.org/jit/jit.html), there is overwhelming evidence that the industrial technology curriculum shares significant similarities with engineering and engineering technology programs (http://www.nait.org). Not withstanding the existing differences in status and mission of engineering, engineering technology, and industrial technology, students graduating from any of these three programs often serve at the forefront of present and future technical marvels and innovations. At the most fundamental levels, there should be a core body of knowledge that serves to unite the closely related professions of engineering, engineering technology, and industrial technology. From a societal viewpoint, the industrial technologist's responsibility towards safety and public health equals that of engineers. Due to this reason alone, a curriculum designed to prepare industrial technologists should include the teaching of ethics either as a separate course or blended into the curriculum. The rest of this paper is directed towards preparing a more substantial case for the formal inclusion of ethics in the industrial technology curriculum, and even more importantly, discusses implementation strategies for such an endeavor. The importance of ethics to these technical professions is underscored by the emphasis on ethics at the institutional, industrial, and national levels. In fact, during the last five years alone, 78 papers have been presented at the annual national ASEE conferences (http://www.asee.org) that discuss teaching ethics in the engineering and technology curricula.

Current Status of Treatment of Ethics in Industrial Technology

The discipline of industrial technology as we know it today has a relatively short history (Minty, 2003; www.epsilonpitau.org). Even so, significant contributions, both at the national and international levels, have been accomplished by affiliates of the discipline in the core areas of engineering and technology (Helsel, 2004). The National Association of Industrial Technology (NAIT) provides leadership and also provides a platform for its associates to constantly expand both the breadth and depth of the discipline. NAIT is also the official body responsible for accreditation and certification of industrial technology programs. Industrial technology courses often possess an "engineering" flair (e.g., knowledge base) with the caveat that (a) these are generally not as mathematically intensive as standard engineering courses and (b) industrial technology courses tend to be more laboratory oriented with emphasis on experiential learning Additionally, more than 25% of regular faculty members that teach in industrial technology programs today have terminal degrees in engineering (http://www.nait.org). Leaders and experts in industrial technology have acknowledged that the discipline needs to adapt and adopt from the best practices of other closely affiliated disciplines such as engineering and business in order to achieve success (Ward and Dugger, 2002). The accreditation standards for business programs established by the American Assembly of Collegiate Schools of Business (AACSB), and similar standards for engineering, established by the Accreditation Board for Engineering and Technology (ABET), have clearly specified "ethics" in the required content domain (i.e., knowledge base). Moreover, engineering ethics is one of the core areas in the Fundamentals of Engineering (FE) examination, which must be successfully completed by people seeking the status of registered or professional engineer.

Short of conducting a national survey or similar study, an effective means to gain insight into the existing status of ethics in the industrial

technology curriculum is to examine the standards for both the accreditation of industrial technology programs as well as the certification exams for industrial technologists. The curricular requirements for NAIT accredited Bachelor's degree programs are summarized by its accreditation Standard # 6.3.5; specifically, Table 6.1 embedded under the said clause (www.nait.org). A study of this section reveals that ethics is not one of the required subject matter competency areas. It is true that some students may receive some background in ethics through general education courses or open electives. However, the wisdom in hoping that a student gains competency in ethics by chance or assuming that they are not going to gain professional benefits from this knowledge is highly questionable. Furthermore, the NAIT certification exam cites four key competency areas: production planning and control, safety, quality, and management and supervision. Here again, competency in ethics is not explicitly stated. It may be worthwhile noting that this national exam for certification of industrial technologists is in its infancy, having made its first appearance in 2003.

Additionally, an examination of curricular requirements across a broad range of NAIT accredited degree programs reveals that very few institutions offer coursework in ethics under the auspices of their industrial technology program (http://www.nait.org). We were unable to single out an industrial technology degree curriculum that mandates a course bearing the keyword "ethics." We realize that this observation in itself does not make a case for the lack of coverage of ethics in the curriculum. However, it may be a strong indicator of the presence of a void, which this paper seeks to address. It is quite possible that several programs assume that competency in ethics will be acquired through general education courses or open electives. We assert that if this is the case, the assumption is likely flawed and attempts should be made to correct this by ensuring that competency in ethics is spelled out as a specific requirement.

Current Needs in Treatment of Ethics

Graduates of industrial technology programs typically accept junior level management roles at the entry level or rise to this level quickly. They often provide a critical link between operating staff, senior management, and the engineering team. As hands-on professionals, they are often not only responsible but also accountable in critical operational areas such as quality approval, workplace hazards and safety standards, compliance with environmental laws, and dealing with customers. Each one of these, as well as other operational areas, could potentially pose a myriad of ethical issues. For example, in the quality approval area, the industrial technologist may have the responsibility to maintain records for continued ISO 9000 certification, approve parts that are either being sold to another vendor or end user, or she/he might be given the authority to approve incoming parts from a supplier. One can easily think of a multitude of ethical issues that relate to these responsibilities including integrity of data, integrity of process, maintaining appropriate confidentiality and privacy. The development of new products and services in the 20th century demand unprecedented levels of interdisciplinary collaboration and teamwork, and the 21st century promises to provide even greater challenges in these areas with attendant ethical issues. The switch to a simultaneous engineering mode of product development requires industrial technologists to be actively involved right from the initial concept design stage, thus posing greater involvement in product safety and environmental issues affecting both the individual workplace as well as society in general.

In a recent study (Helsel, 2004), an effective case was made for establishing a code of ethics for industrial technologists much along the lines of those codes that already exist for engineers, which have been ratified by respective professional bodies, such as NCEES, ABET, AIChE (American Institute of Chemical Engineers), ASCE (American Society of Civil Engineers), ASME (American Society of Mechanical Engineers), ASQ (American Society for Quality), and IEEE (Institute of Electrical and Electronics Engineers). In many ways, this paper complements and bolsters that argument. We agree with the delineated position, but go further to state that accreditation standards for industrial technology programs should clearly specify ethics in the content domain of knowledge and outcomes assessment. Contemporaneously, the Certified Industrial Technologist examination should reflect appropriate testing of a candidate's knowledge and skill in dealing with potential ethical issues of the profession.

Addressing the Needs

The field of industrial technology has had a long history of adapting to the needs of the profession so that it will remain relevant over time. Thus, to help fill this current need in industrial technology programs, several key elements are necessary to consider. Specifically, course content domain, teaching resources, teaching methods, and a subsequent plan of action are all necessary components to successful integration of ethics into mainstream industrial technology curricula.

Content Domain

As a discipline, industrial technology encompasses a distinct body of knowledge which is related to, but separate from, that of traditional engineering. This body of knowledge provides a framework from which to develop a course devoted to industrial technology ethics. An effective mechanism for establishing potential course content is the examination of textbooks which are currently being used. At this time, however, no ethics textbook solely dedicated to the discipline of industrial technology exists. Thus, in order to establish an appropriate content domain for ethics which is applicable to the discipline of industrial technology, an examination of tables of contents from several common engineering ethics textbooks would be useful. These are depicted in Table 1. Throughout the table it is evident that many of the topics covered in engineering ethics texts would be equally applicable to the field of industrial technology as well.

Examining Table 1, as well as delving into the substantive content domains of each of these books individually, has identified several areas of commonality that should be amalgamated and utilized in an appropriate course devoted to the ethics of industrial technology. These themes are outlined in Table 2. As this table delineates, the authors recommend essentially seven major focus areas for this type of course. The course should begin with an introduction to ethics, where the student is introduced to this area of study and why it will be essential for their professional careers. Second, the student should be exposed to the foundations of ethical theory, including a brief history of ethical thought, the major theories that are used, and tools for solving problems with moral dilemmas. Third, the student should understand that industrial technology and design are really applications of formal experimentation, and thus safety and responsibility are essential to this field. Fourth, the student should understand the concepts of risk and safety, because the field of industrial technology has many areas where uncertainty abounds, especially in the design and operations arenas. Fifth, the student should learn about the common rights and responsibilities they will have as both employees as well as professionals upon graduation. Sixth, with globalization becoming ubiquitous in the professional world, the student should be aware of the broad impacts that industrial technology can have, including international business concepts, as well as environmental consequences as a result of technological applications. Finally, the student should be aware of professional codes of ethics for other disciplines. Although the field of industrial technology does not currently have one established, there is momentum building to institute a code that formally delineates the common ethics for this profession (Helsel, 2004).

Teaching Resources

For both instructors who are interested in incorporating individual, specific educational modules into existing industrial technology coursework at appropriate locations during the semester, as well as those who may design and implement entire ethics courses devoted to industrial technology, supporting teaching materials are absolutely essential to success. Therefore, a comprehensive listing of both recent textbooks as well as current websites, many of which provide a multitude of case studies, is provided below in Tables 3 through 6. Moreover, these references are categorized according to the two disciplines that most closely intersect the field of industrial technology, namely, engineering (Tables 3 and 4) and business (Tables 5 and 6).

Teaching Methods

Although teaching the theoretical underpinnings of ethics lays essential groundwork, it should not be an end in itself for an industrial technology course. The main objective of this type of course should be to teach practical information and skills to students, so that once they are part of the work force, they will be able to elucidate and examine the moral issues of specific situations that may arise in their professional careers, and will hopefully have the ability to reach reasonable resolutions. Because of

beyond the confines of their own educational settings and personal experiences, and to peer into the challenges, problems, environments, and operating conditions of the real world which, unfortunately, many students are never exposed to until after graduation. Moreover, well-defined, thorough case studies offer students insights into the strengths as well as the frailties of the human condition under the stress of the working world, which they are soon to enter themselves.

Introducing and analyzing case studies in the classroom provides opportunities to teach students how to formally and methodically examine industrial scenarios, and thus hone moral problem solving skills. By using this approach, students can practice discerning relevant facts from opinions, identifying specific moral dilemmas and disagreements, breaking down ethical issues into components, weighing risks and benefits of possible actions, choosing a course of action, justifying this action, and accepting possible repercussions from the choices made (NIEE, 2005).

A challenge for educators is to either develop or find appropriate case studies for use in their own classrooms. The aforementioned teaching resources, which include a fairly extensive listing of textbooks and websites, offer a plethora of case studies. Even though the authors have tried to be exhaustive, many more websites exist which are not listed here, and the reader is encouraged to explore the Internet for more.

Plan of Action

As already discussed, within the context of the industrial technology discipline, the essential need for ethics education is currently not being met. To adequately cover the extensive range of topics relevant to this proposal (i.e., Table 2), the authors recommend a full-semester standalone course. Understandably, not all academic programs will be able to accommodate this addition with all other programmatic requirements currently in place. Therefore, it is beneficial to examine other mechanisms for incorporating ethics instruction, either as individual topics, components, or units that can be used as into specific technical courses (Alenskis, 1997; Arnaldo, 1999; Case, 1998; Krishnamurthi, 1998; Whiting et al., 1998), examining ethical issues during technical problem solving in specific technical courses (Rabins et al., 1996), issues and topics for ethical review during capstone experiences (Pappas and Lesko, 2001; Soudek, 1996), ethics components in coursework dedicated to professionalism (Bhatt, 1993; Fulle et al., 2004), topical seminars (Alford and Ward, 1999), as well as integration throughout the entire curriculum (Marshall and Marshall, 2003; Davis, 1992; Leone and Isaacs, 2001).

Conclusions

The steady growth in the number of industrial technology programs, both at the two-year and four-year levels, during the past thirty years challenges associates of the discipline to constantly look for ways to identify gaps in the existing college curriculum and address these issues to further increase the value of its graduates, bolster their qualities and abilities, and enhance the image of the discipline. Our preliminary research indicates that industrial technology programs should immediately address the lack of a core body of knowledge in ethics specifically aimed to be of service to its students, alumni, and affiliates. Moreover, because this is such an essential area of training, future revisions of the NAIT accreditation standards should specifically include ethics as a core competency requirement, and the Certified Industrial Technologist examination should duly emphasize ethics as an area of testing.

Dr. Kurt A. Rosentrater is a Lead Scientist with the United States Department of Agriculture, Agriculture Research Service, in Brookings, SD. He is a member of Zeta Chapter of Epsilon Pi Tau.

Dr. Radha Balamuralikrishna is an associate professor in the Department of Technology at Northern Illinois University. He is Co-Trustee of Zeta Chapter of Epsilon Pi Tau.

Table 1: Sample Tables of Contents from Several Contemporary Engineering Ethics Texts

Textbook					
Chapter	Fleddermann[a]	Harris[b]	Martin[c]	Mitcham[d]	Schinzinger[e]
1	Introduction	Engineering Ethics: Making the Case	Scope & Aims of Ethics	Is Ethics Relative?	Profession of Engineering
2	Professionalism & Codes of Ethics	Framing the Problem	Moral Reasoning & Ethical Theories	Exploring Different Dimensions of Ethics	Moral Reasoning & Ethical Theories
3	Understanding Ethical Problems	Methods for Moral Problem Solving	Engineering as Social Experimentation	Ethical Theories	Engineering as Social Experimentation
4	Problem Solving Techniques	Organizing Principles	Responsibility for Safety	Ethics & Institutions	Commitment to Safety
5	Risk, Safety, Accidents	Responsible Engineers	Responsibility to Employers	Models of Professionalism	Workplace Responsibilities & Rights
6	Rights & Responsibilities of Engineers	Honesty, Integrity, Reliability	Rights of Engineers	Loyalty	Global Issues
7	Ethics in Research & Experimentation	Risk, Safety, Liability	Global Issues	Honesty	Sample Engineering Codes
8	Doing the Right Thing	Engineers as Employees	Engineers as Managers, Consultants, & Leaders	Responsibility	
9		Engineers & the Environment	Sample Engineering Codes	Informed Consent	
10		International Engineering		Ethical Engineering & Conflict Resolution	
11		Professionalism & Ethics		Engineering & the Environment	

Notes:

[a] Fleddermann, C. 2004. Engineering Ethics. Upper Saddle River, NJ: Pearson Education, Inc.

[b] Harris, C., M. Pritchard, and M. Rabins. 2004. Engineering Ethics: Concepts and Cases. Belmont, CA: Wadsworth Thompson Learning.

[c] Martin, M. and R. Schinzinger. 2004. Ethics in Engineering. New York, NY: McGraw-Hill.

[d] Mitchum, C. and R. Duvall. 2000. Engineering Ethics. Upper Saddle River, NJ: Prentice Hall.

[e] Schinzinger, R. and M. Martin. 2000. Introduction to Engineering Ethics. Boston, MA: McGraw Hill Higher Education.

Table 2: Essential Content Domain for an Industrial Technology Ethics Course

Introduction to Ethics
Professional environments for industrial technologists
Design processes
Importance of morals in professional life
Defining morals
Defining ethics • Personal ethics • Professional ethics
Moral dilemmas
Why study ethics?
Codes of ethics • What are they? • What are they used for? • What are their limitations?
Corporate climates and ethics
Ethical Theories and Moral Reasoning
History of ethical thought
Ethics of Utilitarianism
Ethics of Rights
Ethics of Duty
Truthfulness
Virtue
Customs and ethics
Religion and ethics
Self interest and ethics
Professional commitments
Methods for moral problem solving
Design and Technology as Experimentation
Design process as a process of experimentation
Need for responsible experimentation
Accountability in design
Industrial standards for design
Commitment to Safety
Definitions of safety
Risk and uncertainty in design
Personal risk vs. public risk
Assessing risks
Accepting risks
Reducing risks
Accidents
Risk-benefit analysis
Workplace Responsibilities and Rights
Employee relationships
Employee responsibilities
Ethical responsibilities • Minimalist • Reasonable care • Good works
Impediments to responsibilities
Honesty
Integrity
Reliability
Confidentiality
Conflicts of interest
Professional rights
Employee rights
Company loyalty vs. whistle blowing
Global Issues
International business • International corporations and economics • Technology transfer • International values and practices • International rights • Human rights
Environmental Ethics • Status of the environment • Stewardship vs. corporations and industry • Stewardship vs. government • Stewardship vs. society • Stewardship vs. economics and costs
Professional Codes of Ethics

Table 3: Engineering and Technology Ethics Books

Alcorn, P. A. 2001. *Practical Ethics for a Technological World*. Upper Saddle River, NJ: Prentice Hall.
Beder, S. 1998. *The New Engineer: Management and Professional Responsibility in a Changing World.* Macmillan Education.
Davis, M. 1998. *Thinking Like an Engineer: Studies in the Ethics of a Profession.* Oxford University Press.
Fleddermann, C. 2004. *Engineering Ethics.* Upper Saddle River, NJ: Pearson Education, Inc.
Flores, A. 1990. *Ethics and Risk Management in Engineering*. University Press of America.
Flowers, W. and C. Whitbeck. 1998. *Ethics in Engineering Practice and Research.* Cambridge University Press.
Gorman, M., M. Mehalik, and P. Werhane. 1999. *Ethical and Environmental Challenges to Engineering*. Upper Saddle River, NJ: Prentice Hall.
Gunn, A. and P. Vesiland. 2002. *Hold Paramount: The Engineer's Responsibility to Society*. Thompson Engineering.
Harris, C., M. Pritchard, and M. Rabins. 1997. *Practicing Engineering Ethics*. New York, NY: Institute of Electrical and Electronics Engineers, Inc.
Harris, C., M. Pritchard, and M. Rabins. 2004. *Engineering Ethics: Concepts and Cases*. Belmont, CA: Wadsworth Thompson Learning.
Hekert, J. 2000. *Societal, Ethical, and Policy Implications of Engineering: Selected Readings.* New York, NY: Institute of Electrical and Electronics Engineers, Inc.
Johnson, D. 1990. *Ethical Issues in Engineering.* Upper Saddle River, NJ: Prentice Hall.
Johnson, D. 2000. *Computer Ethics*. Upper Saddle River, NJ: Prentice Hall.
Jonas, H. 1985. *The Imperative of Responsibility: In Search of an Ethics for the Technological Age*. University of Chicago Press.
King, K. and K. Humphreys. 1999. *What Every Engineer Should Know About Ethics.* Marcel Dekker.
Low, N. 2001. *Global Ethics and Environment.* Brunner Routledge.
Martin, M. and R. Schinzinger. 2004. *Ethics in Engineering*. New York, NY: McGraw-Hill.
May, L., S. Collins-Chobanian, and K. Wong. 2002. *Applied Ethics: A Multicultural Approach*. Upper Saddle River, NJ: Prentice Hall.
Mitchum, C. and R. Duvall. 2000. *Engineering Ethics.* Upper Saddle River, NJ: Prentice Hall.
Pincus, R., L. Shuman, N. Hummon, and H. Wolfe. 1997. *Engineering Ethics: Balancing Cost, Schedule, and Risk – Lessons Learned from the Space Shuttle.* Cambridge University Press.
Pourciau, L. 1999. *Ethics and Electronic Information in the Twenty-First Century.* Purdue University Press.
Schinzinger, R. and M. Martin. 2000. *Introduction to Engineering Ethics.* Boston, MA: McGraw Hill Higher Education.
Schlossberger, E. 1993. *The Ethical Engineer.* Temple University Press.
Seebauer, E. and R. Barry. 2000. *Fundamentals of Ethics for Scientists and Engineers*. Oxford University Press.
Severson, R. 1997. *The Principles of Information Ethics.* Sharpe.
Spier, R. 2001. *Science and Technology Ethics.* Routledge.
Spier, R. 2001. *Ethics, Tools and the Engineer.* CRC Press.
Spinello, R. 2002. *Case Studies in Information Technology Ethics.* Upper Saddle River, NJ: Prentice Hall.
Tavani, H. 2003. *Ethics and Technology: Ethical Issues in an Age of Information and Communication Technology.* Wiley.
Unger, S. 1995. *Controlling Technology: Ethics and the Responsible Engineer.* Holt Rinehart and Winston.
Vesilind, P. and A. Gunn. 1998 *Engineering, Ethics, and the Environment*. Cambridge University Press.
Weston, A. 2002. *A Practical Companion to Ethics.* New York, NY: Oxford University Press.
Wilcox, J. and L. Theodore. 1998. *Engineering and Environmental Ethics: A Case Study Approach*. Van Nostrand Reinhold Company.

Table 4: Business Ethics Books

Adams, D. and E. Maine. 1997. *Business Ethics for the 21st Century*. McGraw Hill.
Andersen, B. 2004. *Bringing Business Ethics to Life: Achieving Corporate Social Responsibility*. ASQ Quality Press.
Axelrod, A. 2004. *My First Book of Business Ethics*. Quirk Books.
Beauchamp, T. and N. Bowie. 2003. *Ethical Theory and Business.* Upper Saddle River, NJ: Prentice Hall.
Bowie, N. 1999. *Business Ethics: A Kantian Perspective.* Blackwell Publishers.
Bowie, N. 2002. *The Blackwell Guide to Business Ethics.* Blackwell Publishers.
Bowie, N. and P. Werhane. 2004. *Management Ethics.* Blackwell Publishers.
Boylan, M. 2000. *Business Ethics.* Upper Saddle River, NJ: Prentice Hall.
Callahan, D. 2004. *The Cheating Culture: Why More Americans are Doing Wrong to Get Ahead*. Harvest Books.
Caroselli, M. 2003. *The Business Ethics Activity Book: 50 Exercises for Promoting Integrity at Work*. Amacom.
Cuilla, J. 2004. *Ethics, the Heart of Leadership*. Praeger Paperback.
De Jorge, R. 2003. *The Ethics of Information Technology and Business.* Blackwell Publishers.
DesJardins, J. and J. McCall. 2004. *Contemporary Issues in Business Ethics.* Wadsworth Publishing.
Donaldson, T. and A. Gini. 1995. *Case Studies in Business Ethics.* Upper Saddle River, NJ: Prentice Hall.
Ferrell, O., J. Fraedrich, and L. Ferrell. 2001. *Business Ethics: Ethical Decision Making and Cases.* Houghton Mifflin Company.
Gopalkrishnan, R., P. Iyer, and G. Iyer. 2000. *Teaching International Business: Ethics and Corporate Social Responsibility*. International Business Press.
Hartley, R. 2004. *Business Ethics: Mistakes and Successes.* John Wiley & Sons.
Hartman, L. 2001. *Perspectives in Business Ethics*. McGraw Hill.
Jackson, J. 1996. *An Introduction to Business Ethics.* Blackwell Publishers.
Jennings, M. 2002. *Business Ethics: Case Studies and Selected Readings.* South Western College Publishers.
Johnson, C. 2004. *Meeting the Ethical Challenges of Leadership: Casting Light or Shadow*. Sage Publications.
MacHan, T. and J. Chester. 2003. *A Primer on Business Ethics*. Rowman & Littlefield.
Maxwell, J. 2003. *There's No Such Thing as Business Ethics*. Warner.
Newton, L. and M. Ford. 2002. *Taking Sides: Clashing Views on Controversial Issues in Business Ethics and Society.* McGraw Hill.
Newton, L. and D. Schmidt. 2003. *Wake-Up Calls: Classic Cases in Business Ethics.* South Western College Publishers.
Peterson, R. and O. Ferrell. 2004. *Business Ethics: New Challenges for Business Schools and Corporate Leaders.* Sharpe.
Pincus Hartman, L. 1998. *Perspectives in Business Ethics*. Chicago, IL: Irwin McGraw-Hill.
Richardson, J. 2003. *Annual Editions: Business Ethics 03/04*. McGraw Hill.
Richardson, J. 2004. *Annual Editions: Business Ethics 04/05.* McGraw Hill.
Robin, R. 2004. *Scandals and Scoundrels: Seven Cases that Shook the Academy.* University of California Press.
Shaw, W. 2001. Business Ethics. Wadsworth Publishing.
Shaw, W. 2002. *Ethics at Work: Basic Readings in Business Ethics.* Oxford University Press.
Snoeyenbos, M., R. Almeder, and J. Humber. 2001. *Business Ethics.* Prometheus Books.
Solomon, R. 1993. *Ethics and Excellence: Cooperation and Integrity in Business*. Oxford University Press.
Sternberg, E. 2000. *Just Business: Business Ethics in Action*. Oxford University Press.
Sullivan, W. and L. Shulman. 2004. *Work and Integrity: The Crisis and Promise of Professionalism in America*. Jossey Bass.
Trevino, L. and K. Nelson. 2003. *Managing Business Ethics: Straight Talk About How to do it Right.* Wiley.
Velasquez, M. 2001. *Business Ethics: Concepts and Cases*. Upper Saddle River, NJ: Prentice Hall.
Weiss, J. 2002. *Business Ethics: A Stakeholder and Issues Management Approach*. South Western College Publishers.
Weston, A. 2000. *A 21st Century Ethical Toolbox.* Oxford University Press.
White, T. 1993. *Business Ethics: A Philosophical Reader.* Upper Saddle River, NJ: Prentice Hall.

Table 5: Engineering and Technology Ethics Websites

Case Studies in Economics and Ethics in an Early Biomedical Engineering Class – Vanderbilt University, http://www.vanth.org/docs/003_2002.pdf#search='engineering%20ethics%20case%20studies'
Case Studies in Failures and Ethics for Engineering Educators – University of Alabama, http://www.eng.uab.edu/cee/faculty/ndelatte/case%5Fstudies%5Fproject/
CEE 440: Design Seminar – University of Washington, http://courses.washington.edu/cee440/
Center for the Study of Ethics in the Professions – Illinois Institute of Technology, http://ethics.iit.edu/
Center for the Study of Ethics in Society – Western Michigan University, http://ethics.tamu.edu/
Earthquake Engineering Research Institute, http://www.eeri.org/home/programs_ethics_previous.html
Engineering Ethics – University of Virginia, http://repo-nt.tcc.virginia.edu/ethics/
Engineering Ethics Case Studies – Lake Superior State University, http://asl.lssu.edu/ethics/cases.htm
Murdough Center for Engineering Professionalism – National Institute for Engineering Ethics, http://www.niee.org
Murdough Center for Engineering Professionalism – Texas Tech University, http://www.coe.ttu.edu/ethics/ethics.htm
Philosophy 330: Engineering Ethics – Loyola Marymount University, http://myweb.lmu.edu/jkasmith/phil330.htm
The Internet for Civil Engineers, http://www.icivilengineer.com/General/Engineering_Ethics/
The National Center for Case Study Teaching in Science – State University of New York at Buffalo, http://ublib.buffalo.edu/libraries/projects/cases/ubcase.htm#physics
The Online Ethics Center for Engineering and Science, http://www.onlineethics.org/

Table 6: Business Ethics Websites

American Institute of Certified Public Accountants, http://www.aicpa.org/antifraud/spotlight/030409_cases.asp
Business Ethics – Sharon Stoerger, University of Illinois, http://www.web-miner.com/busethics.htm
Business Ethics ca – The Canadian Resource for Business Ethics, http://www.businessethics.ca
Business Ethics Case Studies – Colorado State University, http://www.e-businessethics.com
Business Ethics Center – Junior Achievement Worldwide, http://www.ja.org/ethics/case_studies.shtml
Case Studies in Business Ethics – Gruner & Jahr USA Publishing, http://www.inc.com/guides/growth/20806.html
Center for Ethics and Business – Loyola Marymount University, http://www.ethicsandbusiness.org/index3.htm
Center for Ethical Business Cultures – University of St. Thomas, Minnesota, http://www.cebcglobal.org/
Center for the Study of Ethics – Utah Valley State College, http://www.uvsc.edu/ethics/curriculum/business/
Complete Guide to Ethics Management: An Ethics Toolkit for Managers – Authenticity Consulting, LLC, http://www.mapnp.org/library/ethics/ethxgde.htm
Ethics Case Studies – Sharon Stoerger, University of Illinois, http://www.web-miner.com/ethicscases.htm
EthicsCenter.ca – Canadian Centre for Ethics and Corporate Policy, http://www.ethicscentre.ca/
Ethics Update – University of San Diego, http://ethics.acusd.edu
EthicsWeb.ca, http://www.ethicsweb.ca
The Center for Business Ethics – University of St. Thomas, Houston, http://www.stthom.edu/cbes/

References

Alenskis, B. A. (1997). Integrating ethics into an engineering technology course: an interspersed component approach. Proceedings of the 1997 American Society for Engineering Education Annual Conference & Exhibition. Session 2247.

Alford, E., and Ward, T. (1999). Integrating ethics into the freshman curriculum: an interdisciplinary approach. Proceedings of the 1999 American Society for Engineering Education Annual Conference & Exhibition. Session 2561.

Arnaldo, S. (1999). Teaching moral reasoning skills within standard civil engineering courses. Proceedings of the 1999 American Society for Engineering Education Annual Conference & Exhibition. Session 1615.

Bhatt, B. L. (1993). Teaching professional ethical and legal aspects of engineering to undergraduate students. 1993 ASEE Frontiers in Education Conference Proceedings, p. 415-418.

Case, E. (1998). Integrating professional ethics into technical courses in materials science. Proceedings of the 1998 American Society for Engineering Education Annual Conference & Exhibition, Session 1664.

Davis, M. (1992). Integrating ethics into technical courses: IIT's experiment in its second year. 1992 ASEE Frontiers in Education Conference Proceedings, p. 64-68.

Dyrud, M. (1998). Ethics education for the third millennium. Proceedings of the 1998 American Society for Engineering Education Annual Conference & Exhibition. Session 1347.

Fulle, R., Richardson, C., and Zion, G. (2004). Building ethics and project management into engineering technology programs. Proceedings of the 2004 American Society for Engineering Education Annual Conference & Exhibition, Session 1348.

Helsel, L. D. (2004). A code of ethics for industrial technology? *Journal of Industrial Technology 20*(4): 1-5.

Krishnamurthi, M. (1998). Integrating ethics into modeling courses in engineering. Proceedings of the 1998 American Society for Engineering Education Annual Conference & Exhibition. Session 2461.

Leone, D., and Isaacs, B. (2001). Combining engineering design with professional ethics using an integrated learning block. Proceedings of the 2001 American Society for Engineering Education Annual Conference & Exhibition. Session 2525.

Marshall, J., and Marshall, J. (2003). Integrating ethics education into the engineering curriculum. Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exhibition. Session 1675.

Minty, G. (2003). The future history of industrial technology. *Journal of Industrial Technology 20*(1): 1-8.

National Institute for Engineering Ethics (NIEE). (2005). Nine basic steps to personal ethical decision making. Available online: http://www.niee.org/pd.cfm?pt=AECM [retrieved 01 June 2005].

Pappas, E., and Lesko, J. (2001). The communication-centered senior design class at Virginia Tech. Proceedings of the 2001 American Society for Engineering Education Annual Conference & Exhibition, Session 1161.

Pritchard, M. S. (1992). Teaching engineering ethics: a case study approach. Available online: http://ethics.tamu.edu/pritchar/an-intro.htm [retrieved 01 June 2005].

Rabins, M., Harris, C., and Hanzlik, J. (1996). An NSF/Bovay endowment supported workshop to develop numerical problems associated with ethics cases for use in required undergraduate engineering courses. 1996 ASEE Annual Conference Proceedings, Session 3332.

Soudek, I. (1996). Teaching ethics to undergraduate engineering students: understanding professional responsibility through examples. 1996 ASEE Annual Conference Proceedings, Session 1661.

Ward, C. D., and Dugger, J. (2002). A comparison of selected categories of accreditation standards of NAIT, ABET and AACSB. *Journal of Industrial Technology 18*(2): 1-8.

Whiting, W., Shaeiwitz, J., Turton, R., and Cailie, R. (1998). 1998 ASEE Annual Conference Proceedings, Session 2213.